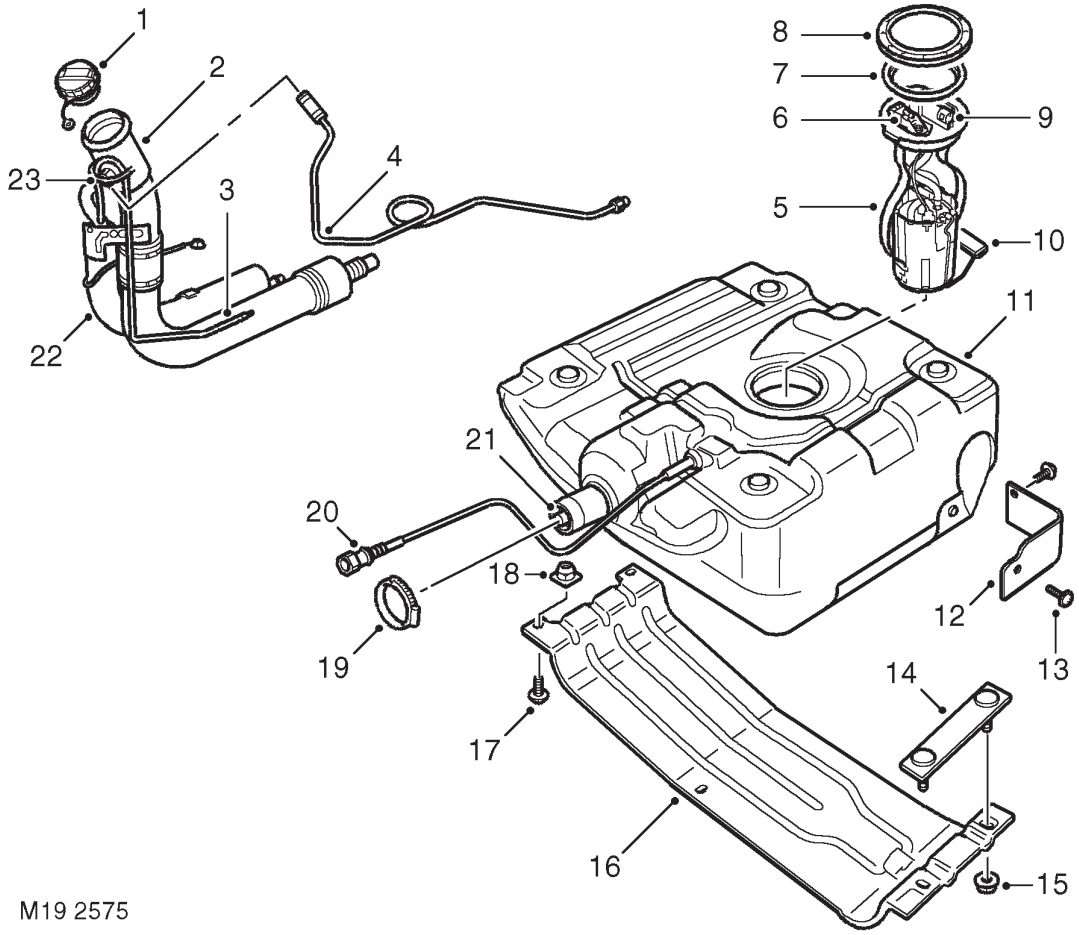
Fuel tank and breather components (NAS)



M19 2575

1 Fuel filler cap
2 Filler tube
3 OBD pressure sensor atmospheric pipe
4 Vent pipe to EVAP canister
5 Fuel pump, regulator and fuel gauge sender assembly
6 OBD pressure sensor (vacuum type, EVAP system leak detection capability only)
7 Seal
8 Locking ring
9 Fuel feed connection
10 Fuel gauge sender float
11 Fuel tank and breather assembly
12 Heat shield
13 Scrivet 2 off
14 Stud plate
15 Nut 2 off
16 Cradle
17 Bolt 2 off
18 Nut plate 2 off
19 Hose clip
20 LVS vent pipe
21 Tank breather connection
22 Liquid vapour separator (LVS)
23 Anti-trickle fill valve

Description

General
The fuel delivery system comprises a fuel tank, fuel pump and regulator and eight injectors. The system is controlled by the Engine Control Module (ECM) which energises the fuel pump relay and controls the operation and timing of each injector solenoid.

☞ **ENGINE MANAGEMENT SYSTEM - V8, DESCRIPTION AND OPERATION, Description - engine management.**

The multiport fuel injection system is a returnless system with the fuel pressure maintained at a constant level by a fuel pressure regulator. The regulator is located in the fuel pump housing and returns excess fuel directly from the pump to the tank.

An electrically operated fuel pump is located in the top of the fuel tank and supplies fuel at pressure to two fuel rails via a flexible hose. The hose is attached to the feed pipe on the fuel rail at the rear of the engine and the fuel pump with sealed quick release couplings.

A moulded fuel tank is located at the rear underside of the vehicle between the chassis longitudinals. The tank provides the attachment for the fuel pump and fuel gauge sender unit which is located inside the tank. The fuel system is pressurised permanently with pressurised fuel vapour venting to an EVAP canister.

☞ **EMISSION CONTROL - V8, DESCRIPTION AND OPERATION, Emission Control Systems.**

Fuel tank and breather
The fuel tank and breather system is a major part of the fuel delivery system. The fuel tank and breathers are located at the rear of the vehicle between the chassis longitudinals.

Fuel tank
The moulded fuel tank is made from High Molecular Weight (HMW) High Density Polyethylene (HDPE). Continuous layers of nylon additive are used during the moulding process. The nylon layers give an improved limit of fuel permeation through the tank wall and are also resistant to alcohol based fuels used in the NAS market.

The tank is retained in position by a metal cradle which is secured to the chassis with two nut plates and bolts at the rear and a stud plate and two nuts at the front. A strap above the tank is bolted to the chassis and restrains the tank from moving upwards. The fuel tank has a useable capacity of approximately 95 litres (25 US Gallons).

An aperture in the top surface of the tank allows for the fitment of the fuel pump, regulator and fuel gauge sender unit which is retained with a locking ring.

A reflective metallic covering is attached to the tank with two scrivets to shield the tank from heat generated by the exhaust system.

The fuel filler is located in the right hand rear quarter panel, behind an access flap. The flap is opened electrically using a switch on the fascia.

The filler is closed by a threaded plastic cap which screws into the filler neck. The cap has a ratchet mechanism to prevent over tightening and seals against the filler neck to prevent the escape of fuel vapour. The filler cap has a valve which relieves fuel pressure to atmosphere at approximately 0.12 to 0.13 bar (1.8 to 2.0 lbf.in^2) and opens in the opposite direction at approximately 0.04 bar (0.7 lbf.in^2) vacuum.

All markets except NAS: A moulded filler tube, made from HMW HDPE with no additional additives, connects the filler to the tank via a flexible rubber hose. The filler tube is connected at its top end behind the filler flap.

NAS markets: A fabricated filler tube, made from stainless steel, connects the filler to the tank via a flexible rubber hose. The filler tube is connected at it's top end behind the filler flap.

On all vehicles that use unleaded fuel, the filler neck is fitted with an inhibitor. The inhibitor is a tapered nozzle in the mouth of the filler neck which will only allow the use of a standard unleaded fuel filler gun. A spring loaded flap valve prevents the incorrect fuel from being trickle filled from an incorrect filler gun.

Fuel tank breather system (all markets except NAS)

The filler tube incorporates a tank vent which allows air and fuel vapour displaced from the tank when filling to vent to atmosphere via the filler neck. A relief valve in the vent line to the EVAP canister prevents vapour escaping through the canister during filling. This prevents the customer overfilling the tank and maintains the correct fuel cut-off level.

The filler tube also incorporates an integral Liquid Vapour Separator (LVS). During normal driving excess fuel vapour is passed via the vent line into the EVAP canister. To prevent the canister from being overloaded with fuel vapour, especially in hot climates, the vapour is given the opportunity to condense in the LVS. Fuel which condenses in the LVS flows back into the tank through the ROV's.

A breather spout within the tank controls the tank 'full' height. When fuel covers the spout it prevents fuel vapour and air from escaping from the tank. This causes the fuel to 'back-up' in the filler tube and shuts off the filler gun. The position of the spout ensures that when the filler gun shuts off, a vapour space of approximately 10% of the tanks total capacity remains. This vapour space ensures that Roll Over Valves (ROV's) are always above the fuel level and the vapour can escape and allow the tank to breathe.

The pressure relief valve fitted in the vent line to the EVAP canister prevents the customer trickle filling the tank. Trickle filling greatly reduces the vapour space in the tank which in turn affects the tank's ability to breathe properly, reducing engine performance and safety. When filling the tank, the pressures created are too low to open the pressure relief valve, preventing the customer from trickle filling the tank. Vapour pressures created during driving are higher and will open the valve allowing vapour to vent to the EVAP canister.

Four ROV's are welded onto the top surface of the tank. Each ROV is connected by a tube to the main vent line to the EVAP canister. The ROV's allow fuel vapour to pass through them during normal vehicle operation. In the event of the vehicle being overturned the valves shut-off, sealing the tank and preventing fuel from spilling from the vent line.

Fuel tank breather system (NAS)

The filler tube incorporates a tank vent which allows air and fuel vapour displaced from the tank when filling to vent to atmosphere via the filler neck. A filler cap operated valve within the fuel filler neck prevents vapour escaping through the EVAP canister during filling. This prevents the customer overfilling the tank and maintains the correct fuel cut-off level.

The filler tube also has an 'L' shaped, stainless steel Liquid Vapour Separator (LVS). During normal driving excess fuel vapour is passed via the vent line into the EVAP canister. To prevent the canister from being overloaded with fuel vapour, especially in hot climates, the vapour is given the opportunity to condense in the LVS. Fuel which condenses in the LVS flows back into the tank via the LVS vent line and through the Roll Over Valves (ROV's).

For NAS vehicles with vacuum type EVAP system leak detection capability, a small tube is located alongside the filler tube and terminates near to the filler neck. The tube is connected to the On Board Diagnostics (OBD) pressure sensor in the fuel pump and provides the sensor with a reading of atmospheric pressure to compare against the tank pressure.

☞ **EMISSION CONTROL - V8, DESCRIPTION AND OPERATION, Emission Control Systems.**

A breather spout within the tank controls the tank 'full' height. When fuel covers the spout it prevents fuel vapour and air from escaping from the tank. This causes the fuel to 'back-up' in the filler tube and shuts off the filler gun. The position of the spout ensures that when the filler gun shuts off, a vapour space of approximately 10% of the tanks total capacity remains. This vapour space ensures that the ROV's are always above the fuel level and the vapour can escape to the LVS and allow the tank to breathe.

The filler cap operated valve closes the vent line to the EVAP canister to prevent the customer trickle filling the tank. Trickle filling greatly reduces the vapour space in the tank which in turn affects the tank's ability to breathe properly, reducing engine performance and safety. When filling the tank, the removal of the filler cap closes the valve and the vent line preventing the customer from trickle filling the tank. When the cap is installed the valve is opened by the cap allowing vapour to vent to the EVAP canister.

The four ROV's are welded inside the top surface of the tank. Each ROV is connected internally in the tank by a tube to the LVS. The ROV's allow fuel vapour to pass through them during normal vehicle operation. In the event of the vehicle being overturned the valves shut-off, sealing the tank and preventing fuel from spilling from the vent line into the LVS.